Hakubi Researchers' Activities in ICR

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HAKUBI RESEARCHERS' ACTIVITIES IN ICR

Hakubi Project: Fosterage and Support of Young Researchers, Kyoto University

Research Topic

Alternative Methods for Energy Conversion in the Solid State

Program-Specific Assoc Prof
NAUMOV, Panche
(D Sc)

Program-Specific Res
NATH, Naba Kamal
(Ph D)

Host Laboratory Laboratory of Molecular Aggregation Analysis and Laboratory of Organoelement Chemistry

Host Professors SATO, Naoki and TOKITOH, Norihiro

Outline of Research

Panche's research interests are in the domain of solid-state structural chemistry. He employs a variety of analytical methods, including new techniques for X-ray diffraction, to study the molecular mechanisms involved in non-classical ways of energy conversion. He tries to understand the structural specifics affecting the transfer of energy throughout matter in these cases. His recent interests include bioluminescence – production of cold light by some organisms – as well as light-induced mechanical effects in molecular crystals.

Research Topic

Algorithmic Graph Theory with Applications to Bioinformatics

Program-Specific Assoc Prof
JANSSON, Jesper
(Ph D)

Host Laboratory Laboratory of Mathematical Bioinformatics

Host Professor AKUTSU, Tatsuya

Outline of Research

During 2012, I worked on various projects related to Graph Algorithms and Bioinformatics. For example, the objective of one of the research projects (joint work with Professor Andrzej Lingas at Lund University, Sweden) is to develop fast methods for measuring the structural similarity between two input phylogenetic networks. We were able to show that if both of the input phylogenetic networks are so-called "galled trees" with n leaves each, then the rooted triplet distance can be computed in o(n^{2.687}) time. This upper bound was obtained by transforming the problem of computing the rooted triplet distance to that of counting monochromatic and almost-monochromatic triangles in an undirected, edge-colored graph. To count different types of colored triangles in a graph efficiently, we extended an existing technique based on matrix multiplication and obtained several new related results that may be of independent interest.